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ABSTRACT

Needs for academic computing services on the West Campus of Virginia Commonwealth University are assessed in this report, which presents data collected by a survey of department chairpersons in five areas: (1) campus-wide needs; (2) general trend in the use of academic computing services; (3) level of need being met; (4) needs for each school or college; and (5) needs for individual departments. It was found that the West Campus departments want more convenient access to computer resources, services that will support writing and publishing, and support for the use of microcomputers. The needs assessment instrument, a glossary, raw scores for the current survey, and data from a 1983 needs assessment are appended. (MES)

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West Campus Academic Computing

Needs Assessment

Spring 1986

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3 July 1986

IR012609

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This report is an assessment of the needs for academic computing services on the West Campus of Virginia Commonwealth University. The report was prepared by the West Campus Academic Computing Advisory Committee and its Instructional Computing Subcommittee at the request of the Vice President for Academic Affairs. The report enumerates the needed services and the degree to which each need is met. The needed services are ranked in priority order for the entire campus and for the individual schools (colleges).

The departments of the West Campus at VCU want more convenient access to the computer resources. The departments are also looking for computer services which will support writing and publishing. The departments are indicating that they want resources which will allow for "self-service" by faculty members. There is a clear need for additional terminals for both student and faculty use. The faculty wants support for the use of microcomputers.

Methodology

The data for the needs assessment was collected from the various department chairpersons using a needs assessment instrument. A copy of this instrument is included in Appendix A. The instrument includes a listing of thirty-five computing services which are typically used in an academic environment. Each of these items is rated for the importance to a department and for the degree to which the need is being met.

The need for each of the computing services is rated on a scale from one to five. A rating of one indicates that the item is essential to the department. A rating of five indicates that the service is useful but not essential. Numbers between one and five indicate

degrees of need between these points. In addition, there is a rating to indicate that a need is not important.

The degree to which need is currently being met is rated on a scale from A to C. A rating of "A" indicates that the need is adequately met by present facilities and services. A rating of "B" indicates the need is partially met while a rating of "C" indicates the need is not met at all.

This instrument is very similar to an instrument used in 1983 for an earlier needs assessment. The current instrument includes all items which were on the 1983 version. In addition, it includes four new items which were not on the earlier instrument. The new items are Terminal Access in Faculty Offices, Support for Microcomputers, Computer Aided Design, and Supercomputers.

The instrument was distributed to each department chairperson. The instrument included the 1983 ratings for the particular department. The department chairpersons were requested to indicate their need or lack of need for each academic computing service. They were also requested to indicate how adequately the need was being met. Many of the department chairpersons enlisted the assistance of "computer experts" within their faculty.

The completed instruments were returned to the respective deans for review. The deans were invited to make comments where appropriate on the individual department instruments. The deans also completed a short questionnaire to indicate the five highest needs for their school (college) and the five highest needs on the West Campus of VCU. The deans then forwarded all the instruments to the Chairman of the Instructional Computing Subcommittee for analysis.

The data from the instruments was analyzed through the use of descriptive statistics. A mean and standard deviation were calculated for each need on the instrument. For purposes of calculation any items marked with an "N" (not important) were given a value of six. Means and standard deviations were calculated for the entire West Campus and for each school (college). The means were then sorted into ascending order for each of these groups. Items with the same value for the mean were arranged alphabetically within that value.

A mean and standard deviation was calculated in a similar manner for the degree to which the need is met. The letter ratings of "A, B, and C" were given numerical values respectively of one, two, and three. If the department indicated that a need was not important then the degree to which the need is met was not used for that department.

A cluster analysis was run in an attempt to identify groups of departments which had similar needs. The cluster analysis was not successful and indicated that generally the departments are different from each other.

Campus Wide Needs

The campus wide needs in descending order from the most needed to the least needed are listed in Table One. The descriptions for each item, in alphabetical order, are included in Appendix B. The items in Table One are in order by the value of the mean calculated from the responses of each department. The means and standard deviations for each item are included in Appendix C. This appendix also includes the descriptive statistics for the degree to which each need is met. The raw scores from each department are included in Appendix D.

Table One: Campus Wide Computing Needs in Descending Order

1. Editing (ie: Wylbur)
2. Text (Word) Processing
3. Terminal Access, Public
4. Publication Quality Printing
5. Support for Microcomputers
6. Terminal Access, Offices
7. High Speed Printing
8. Local Hardware
9. Writing Aids
10. Private Storage Volumes
11. Statistical Analysis
12. Low Resolution Graphics
13. Resource Sharing
14. Data Storage
15. Optical Scanning
16. Computer Aided Instruction
17. Data Banks
18. Special Research Packages
19. Test Generation
20. UNIX Environment
21. Data Base Management System
22. High Resolution Graphics
23. IBM Environment
24. Data Acquisition
25. Business Software
26. Educational Languages
27. Simulation
28. Electronic Communication
29. Scientific Languages
30. Numerical Analysis
31. Process Control
32. Systems Programming Languages
33. Computer Aided Design
34. Computer Science Languages
35. Supercomputer

The order for the needs shown in Table One is very similar to the order of needs from the 1983 needs assessment (see Appendix E). Most items are in the same place or within a few places of their positions on the earlier study. The only major change in order is "UNIX Environment". On the earlier study the UNIX item was close to the end of the list while on the current study it is in the middle of the list.

The four new items were obviously not on the earlier list. Two of these items, Terminal Access in Faculty Offices and Support for

Microcomputers, are at the top of the list. The other two items, Computer Aided Design and Supercomputers, are at the bottom of the list.

A number of conclusions can be drawn from the ordering of the needs for computing services. These conclusions will be discussed in the following sections.

General Trends

The needs at the top of the list seem to indicate several trends in the use of academic computing services. The departments of the West Campus at VCU want more convenient access to the computer resources. This trend is supported by Terminal Access for the Public (3rd.), Support for Microcomputers (5th.), Terminal Access in Offices (6th.), High Speed Printing (7th.), and Local Hardware (8th.).

The departments are also looking for computer services which will support writing and publishing. The needs which support this trend are items such Text (Word) Processing (2nd.), Publication Quality Printing (4th.), Support for Microcomputers (5th.), and Writing Aids (9th.).

The departments seem to be indicating that they want resources which will allow for "self-service" by faculty members. The high ranking of items such as Editing (ie: Wylbur) (1st.), Terminal Access in Offices (6th.), and Private Storage Volumes (10th.) seem to support this trend. Editing as used in this study refers to "WYLBUR" type systems. Text processing refers to word processing types of functions.

There is a clear need for additional terminals for both student and faculty use. This need is indicated by Terminal Access for the Public (3rd.) and Terminal Access in Offices (6th.).

The faculty wants support for the use of microcomputers. Even though this need was not included on the 1983 study it was rated fifth on the current study.

Level of Need Being Met

The computing services in order by the "need is being met" scores are shown in Table Two. The best "need is being met" scores are at the

Table Two:
Campus Wide Computing Services in Order by Need is Met Average

1. Statistical Analysis
2. Optical Scanning
3. Scientific Languages
4. IBM Environment
5. Systems Programming Languages
6. Educational Languages
7. Computer Science Languages
8. Editing (ie: Wylbur)
9. Private Storage Volumes
10. Data Storage
11. Text (Word) Processing
12. High Speed Printing
13. UNIX Environment
14. Numerical Analysis
15. Publication Quality Printing
16. Terminal Access, Public
17. Local Hardware
18. Support for Microcomputers
19. Low Resolution Graphics
20. Data Base Management System
21. Test Generation
22. Special Research Packages
23. Data Banks
24. Resource Sharing
25. Electronic Communication
26. Terminal Access, Offices
27. Writing Aids
28. Simulation
29. Business Software
30. Data Acquisition
31. Supercomputer
32. Computer Aided Design
33. High Resolution Graphics
34. Process Control
35. Computer Aided Instruction

top of the list. The means and standard deviations for the need is met scores are included in Appendix F. The items at the top of this list are generally those services which are used by traditional academic computing users. These services have been available for many years. The typical users of these services include the Mathematical Sciences Department, the Information Systems Department, and numerous faculty members using statistical packages such as SAS and SPSS.

The non-traditional and newer computer users are indicating needs which appear in the middle of Table Two. Most of these items have the highest needs ranking on Table One. This indicates the necessity to expend more resources on the highest ranking needs to raise them to a higher level of the need being met.

The items at the end of the list in Table Two are also at the end of the list on Table One. This seems to indicate that low priority needs are being met very poorly. This also indicates that academic computing resources are not being expended on services which are not important to most of the departments on the West Campus.

Needs for Each School

The needs for each school (college) generally reflect the needs of the entire campus. There are a few items which are more important or less important for a given school. An example of these items are the need for high and low resolution graphics in the School for the Arts. Another example is the need for an IBM environment in the School of Business. The needs in priority order for each school are listed in Table Three.

Table Three: School Computing Needs in Descending Order

	School for the Arts	School of Business	School of Community & Public Affairs
1.	Editing (ie: Wylbur)	Editing (ie: Wylbur)	Editing (ie: Wylbur)
2.	Text (Word) Processing	Publication Quality Printing	Terminal Access, Public
3.	Local Hardware	Terminal Access, Offices	Publication Quality Printing
4.	Terminal Access, Public	Terminal Access, Public	Text (Word) Processing
5.	High Resolution Graphics	High Speed Printing	Statistical Analysis
6.	Support for Microcomputers	IBM Environment	Terminal Access, Offices
7.	Low Resolution Graphics	Optical Scanning	Writing Aids
8.	Writing Aids	Private Storage Volumes	Data Banks
9.	Private Storage Volumes	Statistical Analysis	Data Base Management System
10.	High Speed Printing	Text (Word) Processing	Business Software
11.	Publication Quality Printing	Special Research Packages	High Speed Printing
12.	Computer Aided Instruction	Support for Microcomputers	Local Hardware
13.	Process Control	Test Generation	Low Resolution Graphics
14.	Business Software	Business Software	Special Research Packages
15.	Terminal Access, Offices	Educational Languages	Data Acquisition
16.	Test Generation	Low Resolution Graphics	Data Storage
17.	UNIX Environment	Resource Sharing	High Resolution Graphics
18.	Data Storage	Data Base Management System	Optical Scanning
19.	Data Base Management System	Data Storage	Private Storage Volumes
20.	Educational Languages	Writing Aids	Resource Sharing
21.	Computer Aided Design	Computer Aided Instruction	Support for Microcomputers
22.	Statistical Analysis	Data Banks	Educational Languages
23.	Data Acquisition	UNIX Environment	Scientific Languages
24.	Special Research Packages	Simulation	UNIX Environment
25.	Simulation	Local Hardware	Computer Aided Instruction
26.	Resource Sharing	Scientific Languages	Electronic Communication
27.	Data Banks	Data Acquisition	Simulation
28.	Electronic Communication	Electronic Communication	IBM Environment
29.	IBM Environment	High Resolution Graphics	Numerical Analysis
30.	Systems Programming Languages	Numerical Analysis	Computer Science Languages
31.	Numerical Analysis	Systems Programming Languages	Test Generation
32.	Computer Science Languages	Computer Science Languages	Supercomputer
33.	Scientific Languages	Computer Aided Design	Computer Aided Design
34.	Supercomputer	Process Control	Systems Programming Languages
35.	Optical Scanning	Supercomputer	Process Control

Table Three: School Computing Needs in Descending Order (cont.)

	School of Education	College of Humanities and Sciences	School of Social Work
1.	Local Hardware	Editing (ie: Wylbur)	Editing (ie: Wylbur)
2.	Optical Scanning	Terminal Access, Public	High Speed Printing
3.	Statistical Analysis	Text (Word) Processing	IBM Environment
4.	Support for Microcomputers	Publication Quality Printing	Local Hardware
5.	Terminal Access, Offices	Terminal Access, Offices	Optical Scanning
6.	Terminal Access, Public	High Speed Printing	Publication Quality Printing
7.	Computer Aided Instruction	Resource Sharing	Resource Sharing
8.	Text (Word) Processing	Support for Microcomputers	Statistical Analysis
9.	Writing Aids	Data Storage	Support for Microcomputers
10.	Publication Quality Printing	Optical Scanning	Terminal Access, Offices
11.	Editing (ie: Wylbur)	Private Storage Volumes	Terminal Access, Public
12.	High Speed Printing	Writing Aids	Text (Word) Processing
13.	Test Generation	UNIX Environment	Data Acquisition
14.	Data Banks	Local Hardware	Low Resolution Graphics
15.	Low Resolution Graphics	Data Banks	Private Storage Volumes
16.	Resource Sharing	Data Acquisition	Computer Aided Instruction
17.	Simulation	Special Research Packages	Data Banks
18.	Data Base Management System	Statistical Analysis	Data Base Management System
19.	IBM Environment	IBM Environment	Electronic Communication
20.	Private Storage Volumes	Low Resolution Graphics	Special Research Packages
21.	Business Software	Computer Aided Instruction	UNIX Environment
22.	Data Storage	Test Generation	Writing Aids
23.	High Resolution Graphics	High Resolution Graphics	Simulation
24.	Data Acquisition	Educational Languages	Data Storage
25.	Educational Languages	Electronic Communication	Test Generation
26.	Electronic Communication	Scientific Languages	Business Software
27.	Special Research Packages	Data Base Management System	Computer Aided Design
28.	UNIX Environment	Systems Programming Languages	Computer Science Languages
29.	Computer Aided Design	Simulation	Educational Languages
30.	Process Control	Numerical Analysis	High Resolution Graphics
31.	Scientific Languages	Computer Science Languages	Numerical Analysis
32.	Computer Science Languages	Business Software	Process Control
33.	Numerical Analysis	Process Control	Scientific Languages
34.	Supercomputer	Supercomputer	Supercomputer
35.	Systems Programming Languages	Computer Aided Design	Systems Programming Languages

The needs and degree to which the needs are met for each department are listed in appendices G through L. These appendices contain the information shown in Table Three and the various descriptive statistics.

The School for the Arts (Appendix G) has a great deal of variability within the responses of the departments. This variability

is seen in the large standard deviations around the means for each need. The School for the Arts had less needs for computing services than the other schools. This school also had many more needs which were not being met than did the other schools.

The School of Business (Appendix H) has relatively higher needs for computer services than the other schools. This school also has more needs that are met than do the other schools.

The School for Social Work (Appendix I) has high needs for computing services. The Social Work School has the best need is met scores. These figures should be used with caution since there is only one department in the School of Social Work.

All of the schools except the School for the Arts appear to have a high degree of homogeneity among the respective departments. The responses from the various departments in each school (college) are generally the same as shown in the small standard deviations around means for the needs.

Needs for Individual Departments

There are many unique needs for individual departments which are not reflected in the discussions above. Every need had ratings indicating that the item was essential to a department and also had ratings indicating that the item was not essential. All items except for three have ratings ranging from one to five. The need for computing resources is higher in the professional schools than in the School for the Arts and the College of Humanities and Sciences.

The unique needs are for items such as Supercomputer, Computer Aided Design, Process Control, Numerical Analysis, Electronic Communication, and Simulation. These needs appear to be specific to

particular research areas and/or faculty members. These needs which are at the bottom of the campus wide needs list are not generally important to the other departments. Expending computing resources on these needs will not improve the level of computing services offered to the campus at large.

The meeting of these unique needs appears to be an institutional development issue rather than a computing issue. The administrators at VCU will need to make decisions about which departments will be allowed to have computer resources to meet their unique needs.

The respondents to this survey included more responses than the 1983 study. (The responses to the 1983 survey are included in Appendix M.) This seems to indicate that departments have more computing needs in 1986 than they did in 1983. This increase in the number of responses also indicates that the faculty members are more aware of the uses for academic computing services in their departments.

As departments discover additional uses for computers there will be new users. Many of the users will be from fields which have not used computers in the past. Future planning for academic computing should include the support which these individuals will need.

Some departments and faculty members may not be aware that they have a need for academic computing services. Efforts should be made to help these individuals to learn about computing applications.

Recommendations

The following recommendations for expanded computing services should be implemented by Academic Computing West. These recommendations are consistent with the findings of this needs

assessment. These recommendations are for the highest priority needs which are currently not being met at an adequate level.

The top ten needs can be divided into three groups with approximately equal importance scores within each group. The top group as shown in Table Four includes Editing (ie: Wylbur), Text (Word) Processing, and Terminal Access (Public).

Table Four: Top Ten Campus Wide Needs in Importance Order

		--- IMPORTANCE ---		--- NEED IS MET --	
		MEAN	STANDARD DEVIATION	MEAN	STANDARD DEVIATION
1.	Editing (ie: Wylbur)	1.463	0.897	1.950	0.783
2.	Text (Word) Processing	1.561	0.950	2.154	0.745
3.	Terminal Access, Public	1.585	1.161	2.385	0.673
4.	Publication Quality Printing	2.000	1.432	2.368	0.675
5.	Support for Microcomputers	2.098	1.758	2.432	0.689
6.	Terminal Access, Offices	2.146	1.851	2.583	0.604
7.	High Speed Printing	2.220	1.475	2.158	0.754
8.	Local Hardware	2.341	1.879	2.429	0.655
9.	Writing Aids	2.341	1.510	2.622	0.545
10.	Private Storage Volumes	2.488	1.614	2.079	0.539

These three needs were rated at an almost equal level of importance at 1.463, 1.561, and 1.585 respectively. The middle group includes Publication Quality Printing, Support for Microcomputers, Terminal Access (Offices), and High Speed Printing. The mean scores for the importance of these needs were also very similar at 2.000, 2.098, 2.146, and 2.220 respectively. The last group in the top ten includes Local Hardware, Writing Aids, and Private Storage Volumes. The mean scores respectively for these needs were 2.341, 2.341, and 2.488.

These ten needs appear to be the most important needs throughout the West Campus. The importance of these needs tends to be consistently high when looking at the entire campus or when looking at individual schools (colleges).

When deciding which needs to develop, the level to which a need is met must be considered. When the top ten needs are arranged in order from the worst need is met score to the best need is met score the order for the items changes greatly as shown in Table Five. Editing

Table Five: Top Ten Campus Wide Needs in Inverse Need Is Met Order

	--- IMPORTANCE ---		--- NEED IS MET --	
	MEAN	STANDARD DEVIATION	MEAN	STANDARD DEVIATION
1. Writing Aids	2.341	1.510	2.622	0.545
2. Terminal Access, Offices	2.146	1.851	2.583	0.604
3. Support for Microcomputers	2.098	1.758	2.432	0.689
4. Local Hardware	2.341	1.879	2.429	0.655
5. Terminal Access, Public	1.585	1.161	2.385	0.673
6. Publication Quality Printing	2.000	1.432	2.368	0.675
7. High Speed Printing	2.220	1.475	2.158	0.754
8. Text (Word) Processing	1.561	0.950	2.154	0.745
9. Private Storage Volumes	2.488	1.614	2.079	0.539
10. Editing (ie: Wylbur)	1.463	0.897	1.950	0.783

(ie: Wylbur) which was first is now tenth. Writing Aids, Terminal Access (Offices), and Local Hardware move from the second half of the list to the top half. Support for Microcomputers moves up from fifth to third.

Based on the above analysis Academic Computing West should concentrate its efforts on the development and expansion of the following services.

1. Writing Aids
2. Terminal Access, Offices
3. Support for Microcomputers
4. Local Hardware
5. Terminal Access, Public
6. Publication Quality Printing
7. High Speed Printing
8. Text (Word) Processing
9. Private Storage Volumes
10. Editing (ie: Wylbur)

These services should be implemented in the order shown above as resources become available over the next two years (1986-1988). The

services should be implemented using the descriptions listed for each in Appendix B of this report.

In addition the campus administration should give consideration to the needs for individual departments such as Computer Aided Design and a supercomputer. These needs as discussed above are not campus wide needs but are institutional development needs and should be addressed as such.

The implementation of the needs identified above will require multiple solutions. Academic Computing West should be aware of the differences throughout the campus and should encourage departments to develop implementation plans which best meet their specific needs. There should, however, be some uniformity in the hardware and software selected to meet similar needs.

Some departments which have not used computing services will need to be shown how computers can be used in their fields. This may involve the introduction of some very basic applications. This should be viewed as a development effort which will take several semesters before it bears fruit.

All efforts to meet the ten needs identified above should, where possible, make use of the Local Area Network (LAN). Departments should be encouraged to tie into the LAN to provide a unified approach to the university computing services. This may require that Academic Computing provide connections and wiring into each department and faculty office.

The LAN should be developed so that other computing resources in the University are easily accessible from it. Some of the current

resources are the IBM mainframe in the Plaza Building and the VAX on East Campus.

The LAN should also be connected to other machines which may provide useful resources for the faculty and students. For example, ALIS, the new online catalog in the University Libraries, would be an ideal resource to make available through the LAN from any terminal on campus or through dial-up facilities on the LAN. The future will bring additional applications such as this and the long range development and planning of Academic Computing West should provide for such services.

All of the above services imply that appropriate support and training be provided by Academic Computing West. The assignment of responsibilities among the staff members should reflect expertise in each of the ten areas listed above. The individuals on the staff of Academic Computing West must also, and perhaps more importantly, have the ability and desire to serve in a truly supportive role to the faculty and students. This may require changes in the orientation of Academic Computing West and the perception of the faculty toward it.

The current services which are provided at an adequate level should not be neglected as other services are added. These other services are important to many departments and need to be continued. First priority should not, however, be given to expansion of these other services but should be directed to the ten needs listed above.

Conclusion

This assessment reflects the computing needs of the departments on the West Campus of Virginia Commonwealth University. The assessment reflects the perceptions of the various departments and their diverse

needs. By building upon the results of this needs assessment and the recommendations of this report Academic Computing West can better serve the faculty and students at VCU.

APPENDIX A

NEEDS ASSESSMENT INSTRUMENT

Assessment of Academic Computing Needs on the West Campus

Instructional Computing Subcommittee
West Campus Academic Computing Advisory Committee
Virginia Commonwealth University

The Instructional Computing Subcommittee is conducting an assessment of the needs for academic computing services and facilities on the West Campus of Virginia Commonwealth University. This needs assessment will be used in the development of a long range plan for West Campus Academic Computing. The subcommittee is soliciting input from all departments on the West Campus. This instrument lists thirty-five possible computing needs. Each department should indicate the importance of a particular need and the degree to which that need is being met.

The importance of each need is rated on a five point scale. A rating of 1 means "essential to the department" while a rating of 5 means "useful but not essential". Ratings of 2, 3, and 4 indicate degrees of need. In addition, an "N" indicates that a need is not important to a department. A need should be graded "A" if it is adequately met for the department by present facilities and services, "B" if it is partially met, and "C" if it is not met at all

The committee has included the department's responses to a similiar needs assessment in 1983. Since 1983 many changes have taken place in the computer technology, available software, and in the way that Academic Computing is organized at VCU. Departments should feel free to choose different responses for the current assessment. Questions about the instrument should referred to Dr. Edward Caffarella in the School of Education at 257-1324. The completed questionaires should be returned to the respective dean's office by March 7, 1986.

Department: School/College:

Completed by: _____ Phone: _____

83 Response

86 Response

Data Acquisition

Data acquisition support systems facilitate the transferral of information from a variety of sources into machine readable storage. Some examples are laboratory tools for collecting data which are interfaced directly with a computer, thus allowing immediate and direct transmission of data to machine readable storage, and automated assessment software which provides the ability to test or interview subjects interactively at a terminal. Questions can appear on the terminal screen to which the subject can respond directly to the computer. The computer actually conducts the test or interview process and no questionaires have to be completed and no separate data entry function has to be provided.

Importance

___

Need is met

___

Importance

1 2 3 4 5 N

Need is met

A B C

Scientific Languages

Certain languages, referred to as scientific languages, are particularily suited for the extensive arithmetic and formula computations usually associated with scientific applications. These languages facilitate efficient computation and ease of programming in such applications. Examples of scientific languages are FORTRAN, PL/I, and APL.

Importance

___

Need is met

___

Importance

1 2 3 4 5 N

Need is met

A B C

Special Reasearch Packages

Special research application systems are already in use in a number of research areas, and we expect the academic community to find and to deliver new applications as they become aware of the rapidly increasing availability of software.

Importance

___

Need is met

___

Importance

1 2 3 4 5 N

Need is met

A B C

Department:

83 Response 86 Response

Numerical Analysis

Numerical analysis creates a high demand for raw computation. In addition to faculty developed software, special software is used for numerical analysis and related mathematical applications. Examples of such software are the FORMAC, IMSL, and EISPAC packages.

Importance ___ Need is met ___

Importance 1 2 3 4 5 N Need is met A B C

Data Storage

A data storage center capable of infinate archival of data will allow researchers to store massive quantities of data for their research activities. There should be no limitation on file sizes for researchers. Automatic migration of data from one type of storage media to another will facilitate this type of storage.

Importance ___ Need is met ___

Importance 1 2 3 4 5 N Need is met A B C

Supercomputer

Supercomputers are among the recent developments in computer hardware. Supercomputers provide massive amounts of processing power which is becomming necessary in some diciplines.

Importance ___ Need is met ___

Importance 1 2 3 4 5 N Need is met A B C

Computer Science Languages

The support of Computer Science requires the availability of languages such as Pascal, Assembler, ALGOL, LISP, and SNOBOL. These languages are well suited for the instruction and application of computer science concepts, such as language structure and compiler construction.

Importance ___ Need is met ___

Importance 1 2 3 4 5 N Need is met A B C

Department:

	83 Response	86 Response
Systems Programming Languages	Importance	Importance
Certain languages are well suited for systems programming. Systems programming is the development of large, complex systems either to provide general services at the "machine level" (eg: computer operating system) or to serve major applications (eg: a data base system). Languages used in systems programming include Assembler, PL/I, FORTRAN, C, COBOL, and Pascal.	___	1 2 3 4 5 N
	Need is met	Need is met
	___	A B C
UNIX Environment	Importance	Importance
Because of its widespread use in Computer Science, computing professionals are increasingly expected to be familiar with the UNIX computing environment. UNIX is widely recognized as the most powerful operating system available for microcomputers (eg: 68000, 8086, Z8000) and is also used on mainframe machines (eg: IBM, Cray). UNIX is currently used mostly for text processing, system development, and instruction in Computer Science.	___	1 2 3 4 5 N
	Need is met	Need is met
	___	A B C
High Speed Printing	Importance	Importance
High speed printers provide a means of producing large amounts of printout quickly on stock paper or special forms. Although output is not publication quality it is suitable for most program output, classroom assignments or preliminary drafts of papers intended for publication. Since one high speed printer can serve a large number of users, it is not necessary to have one at every cluster of terminals, but one should be within a short walking distance of each cluster.	___	1 2 3 4 5 N
	Need is met	Need is met
	___	A B C
Business Software	Importance	Importance
Business, management, and financial software, including electronic spreadsheet systems, are heralded under the title of Decision Support Systems. Other systems that may be included in this category are inventory control and investment packages.	___	1 2 3 4 5 N
	Need is met	Need is met
	___	A B C

Department:

83 Response 86 Response

Resource Sharing

Importance Importance

Resource sharing includes the sharing of data banks, software, data storage media, computers and output devices. A mechanism of easily transferring files from one device or system to another with no regard for the nature or location of the hardware is an inherent requirement of resource sharing. Resource sharing may include not only computing resources at VCU but external resources as well. Subscriptions to data networks can be obtained whereby users could gain access to data and software at other universities or research centers.

___ 1 2 3 4 5 N

Need is met Need is met

___ A B C

Electronic Communication

Importance Importance

Electronic communication is a papperless vehicle for sending mail or messages to other computer users. Communication can be sent from one user to another on a single system or, in a network environment, communication can be sent to users on any system (or node) on the network regardless of physical location. Mail systems provide a mechanism to notify the sender when a message has been received.

___ 1 2 3 4 5 N

Need is met Need is met

___ A B C

Data Base Management System (DBMS)

Importance Importance

A DBMS uses special programs to manage information stored in large data banks (or files). Changes can be made or information can be obtained selectively by keyed or conditional searches. A good DBMS would greatly facilitate the maintenance and usefulness of large data banks for the researcher.

___ 1 2 3 4 5 N

Need is met Need is met

___ A B C

IBM Environment

Importance Importance

An IBM environment refers to the specific features offered by or associated with IBM mainframe computers. Students with IBM experience have an advantage in today's job market, where IBM experience is desirable. The IBM environment is provided by the current IBM mainframe at VCU.

___ 1 2 3 4 5 N

Need is met Need is met

___ A B C

83 Response

86 Response

Simulation

Model simulation via computer is greatly facilitated by the use of special simulation software packages. These packages allow the user to conveniently describe the model to the computer. Then, during the actual simulation execution, all model parameters are handled automatically according to the model description.

Importance ___

Need is met ___

Importance 1 2 3 4 5 N

Need is met A B C

Low Resolution Graphics

Applications would include business and statistical graphing such as line graphs, bar graphs, and pie charts. These are useful for color and monochrome pictorial representation of data for publication or presentations in a large variety of diciplines.

Importance ___

Need is met ___

Importance 1 2 3 4 5 N

Need is met A B C

Private Storage Volumes

Private storage volumes are storage media that can be removed from the computer area at the users discretion. Floppy disks or magnetic tape volumes are usually for this purpose and are necessary for transporting data or software to and from other computer sites.

Importance ___

Need is met ___

Importance 1 2 3 4 5 N

Need is met A B C

Educational Languages

Academic courses intended to train students in the use of computers usually include the teaching of computer languages. These languages provide a foundation in computing or are likely to be used by students in future employment. They include BASIC, Pascal, COBOL, Assembler, PL/I, and FORTRAN.

Importance ___

Need is met ___

Importance 1 2 3 4 5 N

Need is met A B C

83 Response

86 Response

High Resolution Graphics

Realistic quality image production requires high resolution graphics. High resolution graphics facilities should include hard copy output devices and terminal displays and may have capabilities for color output. This is the primary tool in computer graphics research research, design, and pictoral arts.

Importance ___

Need is met ___

Importance 1 2 3 4 5 N

Need is met A B C

Local Hardware

Local control of hardware is needed by those departments with special requirements such as graphing, drafting, design, image processing, computation-intensive applications or local access to special devices such as floppy disk drives, printers, graphics terminals or plotters.

Importance ___

Need is met ___

Importance 1 2 3 4 5 N

Need is met A B C

Support for Microcomputers

Support for microcomputers includes assistance in the selection of hardware and software. The support should also include training and consultation of the use of the microcomputer systems.

Importance ___

Need is met ___

Importance 1 2 3 4 5 N

Need is met A B C

Computer Aided Design

Computer aided design is used in a wide variety of fields which are involved in design activities. The computer stores and plots the design. In addition the computer assists the user in the development of the design.

Importance ___

Need is met ___

Importance 1 2 3 4 5 N

Need is met A B C

83 Response | 86 Response

Editing

For users who access the computer through a terminal, an interactive text editing system provides a convenient means for constructing, altering and storing data files. The data for a file can be typed in directly at the terminal keyboard. Editor tools are used to conveniently alter data previously entered.

Importance ___ | Importance 1 2 3 4 5 N

Need is met ___ | Need is met A B C

Optical Scanning

In certain applications, computer scan sheets provide an appropriate method for entry of data into the computer. Such applications include multiple choice test grading and the analysis of survey data, since the student and the survey interviewer can mark information directly on the scan sheets. An optical scanner is used to "read" or interpret the pencil markings on the sheets, thus obviating the need for typing in the data.

Importance ___ | Importance 1 2 3 4 5 N

Need is met ___ | Need is met A B C

Test Generation

The process of generating, grading, and managing tests can be handled "automatically" via computer. Special software can be used to maintain a data bank of questions, select and print questions for a particular test, perform test grading, provide a statistical analysis of the results, and allow the instructor to conveniently update the question data bank as needed.

Importance ___ | Importance 1 2 3 4 5 N

Need is met ___ | Need is met A B C

Statistical Analysis

Statistical analysis generally requires many complex, tedious computations. Statistical packages allow the computer to perform these computations automatically at the request of the user. Most packages also provide facilities for modifying and manipulating data. Packages currently used for statistics at VCU include SAS, SPSS(X), BMDP, Minitab, and IMSL.

Importance ___ | Importance 1 2 3 4 5 N

Need is met ___ | Need is met A B C

Department:

83 Response

86 Response

Data Banks

Importance

___

Need is met

___

Importance

1 2 3 4 5 N

Need is met

A B C

Data banks of information in most diciplines are available from federal and state agencies, other universities and commercial research corporations. Some examples that are currently in use at VCU are NORC files for the social sciences, CENSUS files which are used by Urban Studies and Planning and the Center for Public Affairs, COMPUSTAT files of financial and statistical market information and a variety of test banks used for test generation.

Writing Aids

Importance

___

Need is met

___

Importance

1 2 3 4 5 N

Need is met

A B C

Various writing tools are available via computer which can aid the writing process. These tools perform various functions, such as checking spelling, punctuation and grammar, and even analyzing writing style.

Text Processing

Importance

___

Need is met

___

Importance

1 2 3 4 5 N

Need is met

A B C

Document preparation systems are used to produce formatted text ranging from simple memos and reports to publication quality papers and theses. These systems offer numerous convenient facilities, such as automatic margin alignment, title centering, page and chapter numbering and footnotes. They also allow the user to make changes to the content or format of the document without having to "retype" the entire document.

Department:

83 Response

86 Response

Publication Quality Printing

Publication quality printers are required for final drafts of documents intended for publication, documents requiring special layout, special symbols or fonts not available on the high speed printers. There are phototypesetters, laser printers, and hardcopy terminals which are capable of producing publication quality output. These printers are not necessary at every terminal site, but should be within a short walking distance.

Importance ___ Need is met ___

Importance 1 2 3 4 5 N Need is met A B C

Terminal Access, Public

Terminals for the general public provide the user with a means of communicating interactively with the system. Data, text, and programs can be entered and edited at the terminal. Program development can be accomplished by entering, executing and reviewing the output from a program right at the terminal. Program modifications can be made at the terminal and execution and review can be repeated until the desired results are obtained. Hard copy output is not usually needed until changes to text, data, or programs are complete or nearly complete. Access to terminals must be adequate and convenient to faculty and students in order for instructional and research efforts to be accomplished in a timely manner.

Importance ___ Need is met ___

Importance 1 2 3 4 5 N Need is met A B C

Terminal Access, Faculty Offices and Laboratories

Terminals in offices and laboratories provide faculty members with a means of communicating interactively with the system in a relatively private environment. Faculty have many uses for terminals which are not conducive to public areas such as research, course development, and writing.

Importance ___ Need is met ___

Importance 1 2 3 4 5 N Need is met A B C

83 Response 86 Response

Computer Aided Instruction (CAI)

Importance Importance

___ 1 2 3 4 5 N

CAI packages which provide tutorial interaction with the student are available for a variety of diciplines. These packages which present material to the student, ask questions, and provide feedback are not to be confused with systems which merely print page after page of documentation at the terminal and provide no interaction with the student.

Need is met Need is met

___ A B C

Process Control

Importance Importance

___ 1 2 3 4 5 N

Process control refers to the use of a computer to control physical processes as they are in progress. Examples are a computer system directly controlling laboratory equipment or a graphics system displaying user drawings on a terminal as they are being drawn. Any data from the process can be stored as it is produced.

Need is met Need is met

___ A B C

Additional Needs

Please use the space below to outline other computing needs of your department which are not included in the above items.

Department: 41

APPENDIX B

COMPUTING SERVICES NEEDS IN ALPHABETICAL ORDER

Business Software

Business, management, and financial software, including electronic spreadsheet systems, are heralded under the title of Decision Support Systems. Other systems that may be included in this category are inventory control and investment packages.

Computer Aided Design

Computer aided design is used in a wide variety of fields which are involved in design activities. The computer stores and plots the design. In addition the computer assists the user in the development of the design.

Computer Aided Instruction (CAI)

CAI packages which provide tutorial interaction with the student are available for a variety of disciplines. These packages which present material to the student, ask questions, and provide feedback are not to be confused with systems which merely print page after page of documentation at the terminal and provide no interaction with the student.

Computer Science Languages

The support of Computer Science requires the availability of languages such as Pascal, Assembler, ALGOL, LISP, and SNOBOL. These languages are well suited for the instruction and application of computer science concepts, such as language structure and compiler construction.

Data Acquisition

Data acquisition support systems facilitate the transferral of information from a variety of sources into machine readable storage. Some examples are laboratory tools for collecting data which are interfaced directly with a computer, thus allowing immediate and direct transmission of data to machine readable storage, and automated assessment software which provides the ability to test or interview subjects interactively at a terminal. Questions can appear on the terminal screen to which the subject can respond directly to the computer. The computer actually conducts the test or interview process and no questionnaires have to be completed and no separate data entry function has to be provided.

Data Banks

Data banks of information in most disciplines are available from federal and state agencies, other universities and commercial research corporations. Some examples that are currently in use at VCU are NORC files for the social sciences, CENSUS files which are used by Urban Studies and Planning and the Center for Public Affairs, COMPUSTAT files of financial and statistical market information and a variety of test banks used for test generation.

Data Base Management System (DBMS)

A DBMS uses special programs to manage information stored in large data banks (or files). Changes can be made or information can be obtained selectively by keyed or conditional searches. A good DBMS would greatly facilitate the maintenance and usefulness of large data banks for the researcher.

Data Storage

A data storage center capable of infinite archival of data will allow researchers to store massive quantities of data for their research activities. There should be no limitation on file sizes for researchers. Automatic migration of data from one type of storage media to another will facilitate this type of storage.

Editing (ie: Wylbur)

For users who access the computer through a terminal, an interactive text editing system provides a convenient means for constructing, altering and storing data files. The data for a file can be typed in directly at the terminal keyboard. Editor tools are used to conveniently alter data previously entered.

Educational Languages

Academic courses intended to train students in the use of computers usually include the teaching of computer languages. These languages provide a foundation in computing or are likely to be used by students in future employment. They include BASIC, Pascal, COBOL, Assembler, PL/I, and FORTRAN.

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Local Hardware

Local control of hardware is needed by those departments with special requirements such as graphing, drafting, design, image processing, computation-intensive applications or local access to special devices such as floppy disk drives, printers, graphics terminals or plotters.

Low Resolution Graphics

Applications would include business and statistical graphing such as line graphs, bar graphs, and pie charts. These are useful for color and monochrome pictorial representation of data for publication or presentations in a large variety of disciplines.

Numerical Analysis

Numerical analysis creates a high demand for raw computation. In addition to faculty developed software, special software is used for numerical analysis and related mathematical applications. Examples of such software are the FORMAC, IMSL, and EISPAC packages.

Optical Scanning

In certain applications, computer scan sheets provide an appropriate method for entry of data into the computer. Such applications include multiple choice test grading and the analysis of survey data, since the student and the survey interviewer can mark information directly on the scan sheets. An optical scanner is used to "read" or interpret the pencil markings on the sheets, thus obviating the need for typing in the data.

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Scientific Languages

Certain languages, referred to as scientific languages, are particularily suited for the extensive arithmetic and formula computations usually associated with scientific applications. These languages facilitate efficient computation and ease of programming in such applications. Examples of scientific languages are FORTRAN, PL/I, and APL.

Simulation

Model simulation via computer is greatly facilitated by the use of special simulation software packages. These packages allow the user to conveniently describe the model to the computer. Then, during the actual simulation execution, all model parameters are handled automatically according to the model description.

Special Research Packages

Special research application systems are already in use in a number of research areas, and we expect the academic community to find and to deliver new applications as they become aware of the rapidly increasing availability of software.

Statistical Analysis

Statistical analysis generally requires many complex, tedious computations. Statistical packages allow the computer to perform these computations automatically at the request of the user. Most packages also provide facilities for modifying and manipulating data. Packages currently used for statistics at VCU include SAS, SPSS(X), BMDP, Minitab, and IMSL.

Supercomputer

Supercomputers are among the recent developments in computer hardware. Supercomputers provide massive amounts of processing power which is becomming necessary in some diciplines.

Support for Microcomputers

Support for microcomputers includes assistance in the selection of hardware and software. The support should also include training and consultation of the use of the microcomputer systems.

Systems Programming Languages

Certain languages are well suited for systems programming. Systems programming is the development of large, complex systems either to provide general services at the "machine level" (eg: computer operating system) or to serve major applications (eg: a data base system). Languages used in systems programming include Assembler, PL/I, FORTRAN, C, COBOL, and Pascal.

Terminal Access, Faculty Offices and Laboratories

Terminals in offices and laboratories provide faculty members with a means of communicating interactively with the system in a relatively private environment. Faculty have many uses for terminals which are not conducive to public areas such as research, course development, and writing.

Terminal Access, Public

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UNIX Environment

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Writing Aids

Various writing tools are available via computer which can aid the writing process. These tools perform various functions, such as checking spelling, punctuation and grammar, and even analyzing writing style.

APPENDIX C

CAMPUS WIDE NEEDS

		--- IMPORTANCE ---		--- NEED IS MET --	
		MEAN	STANDARD DEVIATION	MEAN	STANDARD DEVIATION
1.	Editing (ie: Wylbur)	1.463	0.897	1.950	0.783
2.	Text (Word) Processing	1.561	0.950	2.154	0.745
3.	Terminal Access, Public	1.585	1.161	2.385	0.673
4.	Publication Quality Printing	2.000	1.432	2.368	0.675
5.	Support for Microcomputers	2.098	1.758	2.432	0.689
6.	Terminal Access, Offices	2.146	1.851	2.583	0.604
7.	High Speed Printing	2.220	1.475	2.158	0.754
8.	Local Hardware	2.341	1.879	2.429	0.655
9.	Writing Aids	2.341	1.510	2.622	0.545
10.	Private Storage Volumes	2.488	1.614	2.079	0.539
11.	Statistical Analysis	2.610	1.973	1.529	0.748
12.	Low Resolution Graphics	2.634	1.699	2.444	0.558
13.	Resource Sharing	2.805	1.647	2.543	0.505
14.	Data Storage	2.854	1.783	2.139	0.639
15.	Optical Scanning	2.902	1.960	1.656	0.701
16.	Computer Aided Instruction	3.049	1.658	2.886	0.323
17.	Data Banks	3.049	1.673	2.529	0.507
18.	Special Research Packages	3.146	2.056	2.517	0.509
19.	Test Generation	3.146	1.636	2.514	0.562
20.	UNIX Environment	3.171	1.909	2.194	0.654
21.	Data Base Management System	3.195	1.647	2.471	0.706
22.	High Resolution Graphics	3.195	1.860	2.813	0.397
23.	IBM Environment	3.293	1.952	1.759	0.786
24.	Data Acquisition	3.341	1.741	2.667	0.595
25.	Business Software	3.415	1.910	2.667	0.480
26.	Educational Languages	3.415	2.049	1.857	0.756
27.	Simulation	3.659	1.769	2.645	0.661
28.	Electronic Communication	3.780	1.458	2.583	0.649
29.	Scientific Languages	4.073	2.042	1.696	0.765
30.	Numerical Analysis	4.341	1.825	2.261	0.810
31.	Process Control	4.415	1.802	2.850	0.366
32.	Systems Programming Languages	4.415	1.962	1.789	0.713
33.	Computer Aided Design	4.512	1.846	2.765	0.437
34.	Computer Science Languages	4.634	1.699	1.900	0.718
35.	Supercomputer	4.878	1.568	2.667	0.686

APPENDIX D

RAW SCORES FOR EACH DEPARTMENT

RAW SCORES BY SCHOOL AND DEPARTMENT

SCH	DEPT	DATAQ	SCIAG	SPREH	NUMEL	DATAO	SUPCR	CSMG	SYSAG	UNIXT	HIGHT	BUSSFR	RESSR	ELECOM	DBMSR	IBMENR	SIMULNH	LORATPH	PRSTOR	EDIUNG	HIAPH	LOCARD	MICRO	CAIDE	EDITSG	OPTSN	TESTCA	STATGE	DATANL	WRITAK	TEXTDO	PUBPRON	TERMIUB	TERMFOF	CAI	PROCNTL
ARTS	ART ED			2B	3C	1C	4C	4C	3A	1C	2C		2C	4B	3B	2B	4C	1B	1B	2B	1C	1B	1C	1C	1B	C	2C	2A	2C	1B	1B	2C	1C	1C	2C	2C
ARTS	ART HIST	3C	A	1B	A	2C	A		A	1C	3B	3C	5C	5C	1C	5C	3C	5C	1C	3B	5C	1A	1A	A	1C	5A	5C	1A	3C	1C	1B	2C	1C	5A	3C	3C
ARTS	COM ARTS	1C	1C	1C		3C	1C	1C	3B	3B	1C			5C	3C		5C	1C	3B	1C	1C	1C	1B	3C	1B	C	C	C	5C	1C	1C	1C	1C	1C	3C	1C
ARTS	CRAFTS										4C	4C						4C			4C			4C	4C		4C	4C	4C	4C	4C	5C	5C	5C		
ARTS	DANCE																	3C	4C						4C		3C				3C				
ARTS	FASHION	1C	5	5	3C	1C	4	5	1C		1C	1C	3C		1C		1C	1C	1C	5C	1C	1C	1C		1C		1C	3C		1C	1C	5C	1C		1C	
ARTS	INT DES	3C	3C	3C	4C	2C	5C	C	C	1C	1C	2C	3C	3C	4C	1C	1C	1C	1B	1C	1C	1C	1C	1C	1C	1B	1C	5C	3C	3C	1C	3C	3B	2C	2C	1C
ARTS	MUSIC	2B	3B	1C	4	2A		2B		1B	2B	2B	4B	3A	4A	2B		1C	2B	1B	1C	1C	1B		1A		4	1C		3C	2C	3B	2B	3B	1B	1B
ARTS	PAINT														3C			2C				3C			3C						3C		2C		
ARTS	PHOTO											3							5		3	5			3					5	5	3C	3C			4C
ARTS	SCULPT	3C	C	C	C	5C	C	C	C	C	5C	3C	3C	2C	C	C	1C	3C	4C	C	1C	1C	1C	1C	4C	4C	4C	5C	4C	1C	2C	2C	3C	3C	2C	2C
ARTS	THEATRE				3C				3B	2C	2C	2C	2C	3A	3B	3B			1B	3B	2C	1C	1C	1C	1B	5C	3C	3B	3B	2C	2B	2C	2C	1C	5C	5C
BUSINESS	ACCT	2C		2C	C	4B	B	5B	3C	3B	1A	1C	2C	5C	2C	1B	4C	2C	1B	3B	2C	1C	2C	C	1B	1B	2B	2B	1C	1C	2C	1B	1B	1B	2C	C
BUSINESS	BUS ADM	3C	1A	2B	2A	2B			3B	3C	1A	2C	2B	4C	3C	1A	1A	1B	1B	1A		4C	2B		1A	1A	1B	1A	2B	3C	1A	1C	1B	1B	3C	
BUSINESS	BUS ED	3C	5B	1B	5C	1B	5C	5B	4A	1B	1B	1B	1B	1B	1B	1B	3C	3B	1B	1A	2C	1B	1B	3C	1A	1B	1B	1A	3B	1C	1A	1B	1B	1C	2C	3C
BUSINESS	ECON	2C	1B	1B	2A	1B	3B	3B	2B	3C	2B	2C	2B	2C	2B	2A	2A	2B	2B	2A	3C	4B	1C	4C	1B	2B	1C	1A	1B	3C	1A	1A	1B	1B	1C	4C
BUSINESS	INFO SYS	2C	2B	1C	3B	1B	2C	1B	1A	1B	1B	1B	1B	1B	1B	1A	1B	1B	1B	1A	2C	1B	1B	2C	1A	1A	1B	1A	3B	1B	1A	1B	1B	1B	1C	3C
BUSINESS	MARKET	5C	1A	1B	1A	2B	C	C	C	2C	1C	2C	2B	4C	2C	1A	3A	1B	1B	2A	4C	4C	1B	C	1A	1A	2B	1A	3C	3B	1A	1B	1B	1B	4C	C
COMM PUB	ADM JUST	3C	4A	2C	5A	2B	5	3B	5B	1C	3B	1C	1C	3C	2C	4C	2C	1C	1B	1C	3C	1C	2C	5	1C	3B	3B	2A	3C	3C	2C	1C	2B	1C	5C	
COMM PUB	RECREA	5C	4A	3C	5C	3A	5A	A	A	3B	3A	2C	3B	2C	3A	3B	A	2B	4B	2C	2B	2B	1C	4B	2B	1A	3A	1A	3B	1C	1B	2C	1C	1C	3B	4B
COMM PUB	REHAB	3A	3A	5C	5C	5B	4C	3B	4B	4B	4A			5C	3C				5B			5B	5A	5	1A	3A	5C	4A	3B	3C	3B	3C	1C	5C	3C	
COMM PUB	URBAN ST	1B	1B	1C	1B	1A	2B	2A	1B	3B	1C	1C	1B	3B	1C	2A	1B	2B	1A	1B	1C	1B	2C	1C	1C	4B	4C	2A	1B	2C	1C	1C	1B	1C	5C	2C
COMM PUB	PUB AFF	2A	3B	1B	2B	3B	4A	4A	A	4A	1C	2C	4C	4C	1B	2B	2C	1C	3C	C	2C	3C	4C	C	1B	3C	4C	1B	2B	1B	1C	1	2	2C	2C	C
COMM PUB	PUB ADMIN	3C	4C	4	3C	3B	5C	5C	5C	4B	2A	2	3B	3C	3C	4C	3C	3B	3B	3B	3B	3B	4B	C	2A	3C	4C	1B	1B	2C	1B	1C	1C	1C	2C	5C

RAW SCORES BY SCHOOL AND DEPARTMENT

SCH	DEPT	DATAQ	SCIL	SPEAG	NUMAN	DATAS	SUPMT	CSSAL	SYSAN	UNIXG	HISTO	BUSSO	RELAM	EDBMC	IBMMS	SIOLE	LORUM	PERIS	EDIUA	HICAR	LOGIC	MICRO	CAIDO	EDPIE	TSTIS	SATSC	DATAT	WRITT	TEXTP	TUTOR	TERMP	TTRMP	CAIDO	PROJC
EDUCATN	ED SERV	4C	5B	5C	5C	1B	5C	5B	5B	1B	1B	3C	3C	5B	3A	3A	3C	3B	5A	3B	2B	1B	1B	5	1B	1A	2B	1A	3B	1B	1B	1B	1C	1C	1C	5
EDUCATN	PHYS ED					5C					3A		3C	2C	4B	5	3C	2B	2B	5	5C	1A	1C		2B	1A	1C	1A	1C	2B	2B	3B	1C	1C	2C	3C
EDUCATN	TEACH ED	3C		2C		4C	C				1B	2C	2C	4C	2C	2A	3C	2B	2B	2A	3C	1C	1C	3C	2B	1B	2B	1A	2C	1B	1B	1B	1C	1C	1B	
EDUCATN	ED STUD	3C	5C	4C		4C					2B	3C	3C	5C	4A	3C	3C	2B	4B		5C	1C	1B		2B	1A	2B	1A	2B	1B	1B	1B	1C	1C	1C	
HUM SCI	BIOLOGY	5C	1A	1B	3B	2B		3A	1A	4B	3A	5B	2B	4B	5C	3A	4C	1B	1A	1B	5C	5C	1C	5C	1A	1B	3B	1A	5B	3C	1C	1B	1B	1C	4C	3C
HUM SCI	CHEMIST	2B	1A	1B	1B	1B	1C	2A	1A	1B	2B	2B	1B	2B	3C	3A	2B	2B	2B	1A	1C	1C	2B	2C	1A	2A	3B	3A	1C	4B	2B	1A	1B	1B	1C	2C
HUM SCI	ENGLISH	3B				2B				1A	2B	3C	3B	3B				5C	1B		3C	1B	1A		1A	1A	4B		1C	1A	1A	1A	1A	1C	3C	
HUM SCI	FOR LANG	4C		3B	C	4B	C	C	C	1B	1B	C	3C	3C	5C	5C	5C	C	3B	5C	C	C	2C	C	1B	3B	2C	C	C	2B	1B	1B	1B	1C	2C	C
HUM SCI	HIST	5C	C	5B	5C	4B	5C	5C	C	3C	2C	C	3C	1C	4C	1A	5C	3C	2C	5B	5C	2B	1B	C	1B	3B	2C	3B	4C	2C	1B	1B	1C	3C	5C	C
HUM SCI	MASS COM	3C	C	3C	C	1B	C	5B	5	1B	1C	2B	3C	5C	5B	5B	2B	5C	3C	3B	2C	2C	1B	3B	1A	1A	3B	1A	1C	1C	1C	3C	1B	1B	3C	3C
HUM SCI	MATH SCI	4B	1B	2B	1C	1B	5C	1A	1A	2A	1C		1C	4B	2C	1B	2C	1B	1B	1A	1B	1B	5B		1A	2B		1B	3B		2B	2B	1B	1B	2C	
HUM SCI	PHIL REL					4B				3C	3A		1C	5C					5B				1C		1C	5		5C	1C	1A	1C	1C			
HUM SCI	PHYSICS	1B	1A	1B	1B	2B	1C	3B	1B	2B	2B	5B	2B	4C	3	2A	4C	3B	2B	4B	2B	1B	5A	3B	1B	3A	3C	5A	3C	4C	3B	2B	4A	1A	4C	2C
HUM SCI	POLI SCI	1C	5A			1C				4A	3B	3B	1C	5C	4C	2	4C	3C	5B				2C		1C	2B	5C	2B	2C	1C	1	4B	2A	3B	5	
HUM SCI	PSYCH	1B	2A	1C	5A	1A	5C				1B		2B	5C	1C	3A	5C	1C	1A	2A	2C	1C	1C		1B	3A	3C	1B	2	2C	1B	1C	1C	1C	3C	
HUM SCI	SOCIOL	1C	3A	1B	4B	1B	3C	3A	3A	3B	2C	3B	1B	3A	1B	1B	4B	2A	2B	3A	3B	1B	1C	3B	2B	1B	1B	1A	1B	3B	1B	2B	1B	1B	3B	3B
SOC WORK	SOC WORK	2C		3C		5A			A	3B	1B		1B	3C	3B	1A	4C	2B	2B			1A	1C		1A	1A	5B	1A	3B	3B	1A	1A	1A	1C	3C	

APPENDIX E

SUMMARY FROM 1983 NEEDS ASSESSMENT

IMPORTANCE OF NEEDS

NEED	RANK	MET	QUARTILES	RANK OF NEED FOR CLUSTER A	B	C	D	E	F	G
Terminal Access	1	C+	1 1 2	2	1	1	1	1	1	12
Editing	2	B+	1 1 2	6	2	4	2	2	5	1
Text Processing	3	B+	1 2 3	9	4	2	3	3	12	8
Publication Quality Printing	4	C+	1 3 4	10	5	7	5	4	18	9
Writing Aids	5	C	1 3 4	7	8	3	4	21	29	29
Local Hardware	6	C+	1 2 6	1	9	6	14	23	2	5
Private Storage Volumes	7	B	1 2 5	8	6	11	6	8	6	16
Statistical Analysis	8	A-	1 3 6	13	17	5	9	5	3	30
Low Resolution Graphics	9	B-	2 3 5	3	3	14	16	9	13	18
High Speed Printing	10	B+	3 3 6	16	12	9	11	12	14	10
Optical Scanning	11	A	1 4 6	22	13	8	7	6	7	22
Data Base Management System	12	C+	3 4 5	14	7	16	10	17	8	19
Data Storage	13	B	2 5 6	24	18	22	8	13	9	6
Resource Sharing	14	C+	2 5 6	19	19	12	17	15	10	11
Data Banks	15	C+	3 5 6	25	20	15	12	16	19	24
Computer Aided Instruction	16	C	3 4 6	4	10	13	13	26	26	25
Special Research Packages	17	B-	1 6 6	23	21	19	20	10	11	2
Test Generation	18	B-	2 5 6	17	14	10	19	19	22	26
IBM Environment	19	A-	2 6 6	26	22	20	27	11	4	13
Educational Languages	20	B+	3 6 6	5	15	24	23	20	15	31
Business Software	21	C+	3 6 6	20	23	17	28	18	27	20
Data Aquisition	22	C+	3 6 6	15	24	18	18	28	30	7
Simulation	23	B-	3 6 6	18	25	23	22	22	20	15
High Resolution Graphics	24	C	4 6 6	11	26	25	25	27	23	14
Numerical Analysis	25	B+	3 6 6	21	27	26	29	14	21	3
Electronic Communication	26	B+	4 5 6	27	16	21	21	24	28	21
Scientific Languages	27	A-	6 6 6	28	28	27	30	7	24	4
UNIX Environment	28	C+	4 6 6	29	29	28	15	25	25	17
Process Control	29	C	6 6 6	12	11	29	24	29	31	23
Computer Science Languages	30	A-	6 6 6	30	30	30	26	30	16	27
Systems Programming Language	31	A-	6 6 6	31	31	31	31	31	17	28

APPENDIX F

CAMPUS WIDE NEEDS IN NEED IS MET ORDER

	--- IMPORTANCE ---		--- NEED IS MET --	
	MEAN	STANDARD DEVIATION	MEAN	STANDARD DEVIATION
1. Statistical Analysis	2.610	1.973	1.529	0.748
2. Optical Scanning	2.902	1.960	1.656	0.701
3. Scientific Languages	4.073	2.042	1.696	0.765
4. IBM Environment	3.293	1.952	1.759	0.786
5. Systems Programming Languages	4.415	1.962	1.789	0.713
6. Educational Languages	3.415	2.049	1.857	0.756
7. Computer Science Languages	4.634	1.699	1.900	0.718
8. Editing (ie: Wylbur)	1.463	0.897	1.950	0.783
9. Private Storage Volumes	2.488	1.614	2.079	0.539
10. Data Storage	2.854	1.783	2.139	0.639
11. Text (Word) Processing	1.561	0.950	2.154	0.745
12. High Speed Printing	2.220	1.475	2.158	0.754
13. UNIX Environment	3.171	1.909	2.194	0.654
14. Numerical Analysis	4.341	1.825	2.261	0.810
15. Publication Quality Printing	2.000	1.432	2.368	0.675
16. Terminal Access, Public	1.585	1.161	2.385	0.673
17. Local Hardware	2.341	1.879	2.429	0.655
18. Support for Microcomputers	2.098	1.758	2.432	0.689
19. Low Resolution Graphics	2.634	1.699	2.444	0.558
20. Data Base Management System	3.195	1.647	2.471	0.706
21. Test Generation	3.146	1.636	2.514	0.562
22. Special Research Packages	3.146	2.056	2.517	0.509
23. Data Banks	3.049	1.673	2.529	0.507
24. Resource Sharing	2.805	1.647	2.543	0.505
25. Electronic Communication	3.780	1.458	2.583	0.649
26. Terminal Access, Offices	2.146	1.851	2.583	0.604
27. Writing Aids	2.341	1.510	2.622	0.545
28. Simulation	3.659	1.769	2.645	0.661
29. Business Software	3.415	1.910	2.667	0.480
30. Data Acquisition	3.341	1.741	2.667	0.595
31. Supercomputer	4.878	1.568	2.667	0.686
32. Computer Aided Design	4.512	1.846	2.765	0.437
33. High Resolution Graphics	3.195	1.860	2.813	0.397
34. Process Control	4.415	1.802	2.850	0.366
35. Computer Aided Instruction	3.049	1.658	2.886	0.323

APPENDIX G

SCHOOL FOR THE ARTS NEEDS

	--- IMPORTANCE ---		--- NEED IS MET --	
	MEAN	STANDARD DEVIATION	MEAN	STANDARD DEVIATION
1. Editing (ie: Wylbur)	2.083	1.379	2.545	0.688
2. Text (Word) Processing	2.167	1.337	2.727	0.467
3. Local Hardware	2.333	2.103	2.667	0.707
4. Terminal Access, Public	2.500	1.624	2.818	0.405
5. High Resolution Graphics	2.667	2.060	3.000	0.000
6. Support for Microcomputers	2.667	2.462	2.500	0.756
7. Low Resolution Graphics	2.833	1.992	2.900	0.316
8. Writing Aids	2.833	1.992	2.889	0.333
9. Private Storage Volumes	2.917	2.021	2.444	0.527
10. High Speed Printing	3.250	2.050	2.778	0.441
11. Publication Quality Printing	3.333	1.723	2.900	0.316
12. Computer Aided Instruction	3.583	2.065	2.875	0.354
13. Process Control	3.583	2.151	2.875	0.354
14. Business Software	3.667	1.875	2.857	0.378
15. Terminal Access, Offices	3.750	2.137	2.625	0.744
16. Test Generation	3.750	1.815	3.000	0.000
17. UNIX Environment	3.750	2.417	2.667	0.516
18. Data Storage	3.833	2.167	2.714	0.756
19. Data Base Management System	3.833	1.850	2.500	0.756
20. Educational Languages	3.833	2.209	2.429	0.535
21. Computer Aided Design	3.917	2.353	3.000	0.000
22. Statistical Analysis	4.000	1.954	2.375	0.916
23. Data Acquisition	4.083	2.109	2.833	0.408
24. Special Research Packages	4.083	2.275	2.600	0.548
25. Simulation	4.250	2.179	3.000	0.000
26. Resource Sharing	4.333	1.670	2.857	0.378
27. Data Banks	4.500	1.508	2.857	0.378
28. Electronic Communication	4.583	1.505	2.286	0.951
29. IBM Environment	4.583	1.975	2.400	0.548
30. Systems Programming Languages	4.833	1.801	2.000	0.816
31. Numerical Analysis	4.917	1.379	3.000	0.000
32. Computer Science Languages	5.000	1.758	2.667	0.577
33. Scientific Languages	5.000	1.706	2.667	0.577
34. Supercomputer	5.167	1.528	3.000	0.000
35. Optical Scanning	5.250	1.485	2.250	0.957

APPENDIX H

SCHOOL OF BUSINESS NEEDS

	--- IMPORTANCE ---		--- NEED IS MET --	
	MEAN	STANDARD DEVIATION	MEAN	STANDARD DEVIATION
1. Editing (ie: Wylbur)	1.000	0.000	1.333	0.516
2. Publication Quality Printing	1.000	0.000	2.000	0.632
3. Terminal Access, Offices	1.000	0.000	2.167	0.408
4. Terminal Access, Public	1.000	0.000	2.000	0.000
5. High Speed Printing	1.167	0.408	1.833	0.753
6. IBM Environment	1.167	0.408	1.333	0.516
7. Optical Scanning	1.167	0.408	1.500	0.548
8. Private Storage Volumes	1.167	0.408	2.000	0.000
9. Statistical Analysis	1.167	0.408	1.167	0.408
10. Text (Word) Processing	1.167	0.408	1.333	0.816
11. Special Research Packages	1.333	0.516	2.333	0.516
12. Support for Microcomputers	1.333	0.516	2.333	0.516
13. Test Generation	1.333	0.516	2.167	0.408
14. Business Software	1.500	0.548	2.667	0.516
15. Educational Languages	1.667	0.816	1.167	0.408
16. Low Resolution Graphics	1.667	0.816	2.167	0.408
17. Resource Sharing	1.667	0.516	2.167	0.408
18. Data Base Management System	1.833	0.753	2.500	0.548
19. Data Storage	1.833	1.169	2.000	0.000
20. Writing Aids	2.000	1.095	2.667	0.516
21. Computer Aided Instruction	2.167	1.169	3.000	0.000
22. Data Banks	2.167	0.983	2.333	0.516
23. UNIX Environment	2.167	0.983	2.500	0.548
24. Simulation	2.333	1.211	1.833	0.983
25. Local Hardware	2.500	1.643	2.500	0.548
26. Scientific Languages	2.667	2.251	1.600	0.548
27. Data Acquisition	2.833	1.169	3.000	0.000
28. Electronic Communication	2.833	1.722	2.667	0.516
29. High Resolution Graphics	3.167	1.602	3.000	0.000
30. Numerical Analysis	3.167	1.941	1.600	0.894
31. Systems Programming Languages	3.167	1.722	1.800	0.837
32. Computer Science Languages	4.333	1.966	2.000	0.000
33. Computer Aided Design	4.500	1.761	3.000	0.000
34. Process Control	4.667	1.506	3.000	0.000
35. Supercomputer	4.667	1.751	2.667	0.577

APPENDIX I

SCHOOL OF COMMUNITY AND PUBLIC AFFAIRS NEEDS

	--- IMPORTANCE ---		--- NEED IS MET --	
	MEAN	STANDARD DEVIATION	MEAN	STANDARD DEVIATION
1. Editing (ie: Wylbur)	1.333	0.516	2.000	0.894
2. Terminal Access, Public	1.333	0.516	2.600	0.548
3. Publication Quality Printing	1.500	0.837	3.000	0.000
4. Text (Word) Processing	1.500	0.837	2.500	0.548
5. Statistical Analysis	1.833	1.169	1.333	0.516
6. Terminal Access, Offices	1.833	1.602	3.000	0.000
7. Writing Aids	2.000	0.894	2.833	0.408
8. Data Banks	2.167	0.983	2.167	0.408
9. Data Base Management System	2.167	0.983	2.500	0.837
10. Business Software	2.333	1.862	3.000	0.000
11. High Speed Printing	2.333	1.211	1.833	0.983
12. Local Hardware	2.500	1.517	2.333	0.516
13. Low Resolution Graphics	2.500	1.871	2.400	0.548
14. Special Research Packages	2.667	1.633	2.800	0.447
15. Data Acquisition	2.833	1.329	2.167	0.983
16. Data Storage	2.833	1.329	1.667	0.516
17. High Resolution Graphics	2.833	1.722	2.600	0.548
18. Optical Scanning	2.833	0.983	2.000	0.894
19. Private Storage Volumes	2.833	1.602	2.000	0.632
20. Resource Sharing	3.000	1.897	2.400	0.548
21. Support for Microcomputers	3.000	1.549	2.500	0.837
22. Educational Languages	3.167	2.317	2.500	0.577
23. Scientific Languages	3.167	1.169	1.667	0.816
24. UNIX Environment	3.167	1.169	2.000	0.632
25. Computer Aided Instruction	3.333	1.366	2.833	0.408
26. Electronic Communication	3.333	1.033	2.833	0.408
27. Simulation	3.333	2.160	2.750	0.500
28. IBM Environment	3.500	1.517	2.200	0.837
29. Numerical Analysis	3.500	1.761	2.333	0.816
30. Computer Science Languages	3.833	1.472	1.800	0.837
31. Test Generation	3.833	0.753	2.500	0.837
32. Supercomputer	4.167	1.169	2.000	1.000
33. Computer Aided Design	4.500	1.871	2.500	0.707
34. Systems Programming Languages	4.500	1.871	2.250	0.500
35. Process Control	4.833	1.602	2.667	0.577

APPENDIX J

SCHOOL OF EDUCATION NEEDS

	--- IMPORTANCE ---		--- NEED IS MET --	
	MEAN	STANDARD DEVIATION	MEAN	STANDARD DEVIATION
1. Local Hardware	1.000	0.000	2.250	0.957
2. Optical Scanning	1.000	0.000	1.250	0.500
3. Statistical Analysis	1.000	0.000	1.000	0.000
4. Support for Microcomputers	1.000	0.000	2.500	0.577
5. Terminal Access, Offices	1.000	0.000	3.000	0.000
6. Terminal Access, Public	1.000	0.000	3.000	0.000
7. Computer Aided Instruction	1.250	0.500	2.750	0.500
8. Text (Word) Processing	1.250	0.500	2.000	0.000
9. Writing Aids	1.250	0.500	2.000	0.000
10. Publication Quality Printing	1.500	1.000	2.000	0.000
11. Editing (ie: Wylbur)	1.750	0.500	2.000	0.000
12. High Speed Printing	1.750	0.957	1.750	0.500
13. Test Generation	1.750	0.500	2.250	0.500
14. Data Banks	2.000	0.816	2.500	0.577
15. Low Resolution Graphics	2.250	0.500	2.000	0.000
16. Resource Sharing	2.750	0.500	3.000	0.000
17. Simulation	3.000	0.000	3.000	0.000
18. Data Base Management System	3.250	0.957	1.750	0.957
19. IBM Environment	3.250	1.258	1.667	1.155
20. Private Storage Volumes	3.250	1.500	1.750	0.500
21. Business Software	3.500	1.732	3.000	0.000
22. Data Storage	3.500	1.732	2.750	0.500
23. High Resolution Graphics	3.750	1.500	2.750	0.500
24. Data Acquisition	4.000	1.414	3.000	0.000
25. Educational Languages	4.000	1.826	1.500	0.707
26. Electronic Communication	4.000	1.414	2.750	0.500
27. Special Research Packages	4.250	1.708	3.000	0.000
28. UNIX Environment	4.750	2.500	2.000	
29. Computer Aided Design	5.000	1.414	3.000	
30. Process Control	5.000	1.414	3.000	
31. Scientific Languages	5.500	0.577	2.500	0.707
32. Computer Science Languages	5.750	0.500	2.000	
33. Numerical Analysis	5.750	0.500	3.000	
34. Supercomputer	5.750	0.500	3.000	
35. Systems Programming Languages	5.750	0.500	2.000	

APPENDIX K

COLLEGE OF HUMANITIES AND SCIENCES NEEDS

	--- IMPORTANCE --- MEAN	STANDARD DEVIATION	--- NEED IS MET -- MEAN	STANDARD DEVIATION
1. Editing (ie: Wylbur)	1.083	0.289	1.750	0.754
2. Terminal Access, Public	1.333	0.888	2.000	0.739
3. Text (Word) Processing	1.333	0.651	2.000	0.632
4. Publication Quality Printing	1.667	0.985	2.083	0.669
5. Terminal Access, Offices	1.750	1.545	2.364	0.674
6. High Speed Printing	1.917	0.793	2.167	0.718
7. Resource Sharing	1.917	0.900	2.500	0.522
8. Support for Microcomputers	1.917	1.505	2.333	0.778
9. Data Storage	2.000	1.279	2.000	0.426
10. Optical Scanning	2.250	1.215	1.545	0.522
11. Private Storage Volumes	2.333	1.435	2.000	0.603
12. Writing Aids	2.500	1.567	2.545	0.688
13. UNIX Environment	2.583	1.564	1.909	0.701
14. Local Hardware	2.750	2.261	2.444	0.527
15. Data Banks	2.833	1.801	2.700	0.483
16. Data Acquisition	3.000	1.809	2.545	0.522
17. Special Research Packages	3.000	2.174	2.222	0.441
18. Statistical Analysis	3.000	2.174	1.444	0.527
19. IBM Environment	3.167	1.899	1.556	0.726
20. Low Resolution Graphics	3.167	1.899	2.400	0.699
21. Computer Aided Instruction	3.417	1.443	2.900	0.316
22. Test Generation	3.417	1.564	2.500	0.527
23. High Resolution Graphics	3.500	1.977	2.667	0.500
24. Educational Languages	3.583	2.021	1.667	0.707
25. Electronic Communication	3.667	1.303	2.500	0.674
26. Scientific Languages	3.667	2.348	1.143	0.378
27. Data Base Management System	3.750	1.765	2.778	0.441
28. Systems Programming Languages	4.000	2.374	1.200	0.447
29. Simulation	4.083	1.443	2.700	0.483
30. Numerical Analysis	4.167	2.125	2.143	0.690
31. Computer Science Languages	4.333	1.826	1.571	0.787
32. Business Software	4.417	1.676	2.143	0.378
33. Process Control	4.583	1.782	2.800	0.447
34. Supercomputer	4.667	1.923	3.000	0.000
35. Computer Aided Design	4.833	1.586	2.400	0.548

APPENDIX L

SCHOOL OF SOCIAL WORK NEEDS

	--- IMPORTANCE --- MEAN	STANDARD DEVIATION	--- NEED IS MET -- MEAN	STANDARD DEVIATION
1. Editing (ie: Wylbur)	1.000		1.000	
2. High Speed Printing	1.000		2.000	
3. IBM Environment	1.000		1.000	
4. Local Hardware	1.000		1.000	
5. Optical Scanning	1.000		1.000	
6. Publication Quality Printing	1.000		1.000	
7. Resource Sharing	1.000		2.000	
8. Statistical Analysis	1.000		1.000	
9. Support for Microcomputers	1.000		3.000	
10. Terminal Access, Offices	1.000		3.000	
11. Terminal Access, Public	1.000		1.000	
12. Text (Word) Processing	1.000		1.000	
13. Data Acquisition	2.000		3.000	
14. Low Resolution Graphics	2.000		2.000	
15. Private Storage Volumes	2.000		2.000	
16. Computer Aided Instruction	3.000		3.000	
17. Data Banks	3.000		2.000	
18. Data Base Management System	3.000		2.000	
19. Electronic Communication	3.000		3.000	
20. Special Research Packages	3.000		3.000	
21. UNIX Environment	3.000		2.000	
22. Writing Aids	3.000		2.000	
23. Simulation	4.000		3.000	
24. Data Storage	5.000		1.000	
25. Test Generation	5.000		2.000	
26. Business Software	6.000			
27. Computer Aided Design	6.000			
28. Computer Science Languages	6.000			
29. Educational Languages	6.000			
30. High Resolution Graphics	6.000			
31. Numerical Analysis	6.000			
32. Process Control	6.000			
33. Scientific Languages	6.000			
34. Supercomputer	6.000			
35. Systems Programming Languages	6.000			

APPENDIX M

RAW SCORES FROM 1983 NEEDS ASSESSMENT

NEEDS RATINGS AND GRADES OF DEGREE MET

ORSH	SCH	DEPT	PAC	TPM_ACC	ED_ACC	TRXT_PRO	POP_PRIM	WRIT_ART	LOC_HAR	PRIV_STR	STA_NAL	LOC_GRA	HI_PBI	OPT_SCA	DBMS	DATA_STA	RES_SAR	DAT_BAK	CAI	SPR_SCH	TES_STG	IBM	ED_LAN	BDS_SOF	DA_ACC	SIMUL	HI_GRA	NUM_ANA	PL_COM	SCI_LAN	UNIX	PPC_CT	CSC_LAN	STS_LAN
1	ARTS	ART ED	7	2C	2C	2B	2C	2C	1B	1P		1P		5A	3C				2C				2B										
2	ARTS	ART HIST	9	1C	1C	1B	2C	1C		1C				5A	1C	2C		3C	3C				3P		3C				5C				
3	ARTS	COM ART	17	1C	2B	3B	3C	2C	1C	3P		2C			3C				3C				2B					2C					
4	ARTS	CRAFTS	8																														
5	ARTS	DANCE	5		4C					4C		3C			4C																		
6	ARTS	FASHION	7	1C	1C	5B	5C	5C	1C	1C	3C	1C	3C		5C		5C		1C		1C		3C	5C	1C	1C	3C	3C					
7	ARTS	INT DES	9	3C	3A	3B	3C	3C	1C	5P		1C	3C		5C		3C		3C	5C			1B	3C	3C		1C				4C		
8	ARTS	MUSIC	25	2C	2A	5B	5C	5C	1C	3B	1C	5C	5A						1B				1B								1C		
9	ARTS	PAINT	15	2C	3C	3C			3C			2C			3C																		
10	ARTS	PHOTO	7	3C	3C	3C	3C	3C																							4C		
11	ARTS	SCULPT	6	3C	4C					4C		3C																					
12	ARTS	THEATRE	13	2C		2C	2C	2C	1C			5C		5A					5C								3C						
13	BUS	ACCT	23	1B	1B	1A	1C	2C	4C	1B	3A	3B	1A	3A	2C	5B	3B	5C	2C		2B	2A	5A	1B				5A	4C				
14	BUS	BUS ADM	48	1B	1A	1A	1C	3C	4C	1P	1A	2B	1A	1A	3C	2B	2B	2C	4C	2B	2B	1A	2A	2C		2A		3A	4C	1A	3C		
15	BUS	BUS ED	7	1B	1A	1A	1C	3C	3B	1B	3A	5B	1A	1A	4C	5B	2B	5C	4C	1A	2P	3A	3A	1B		5C	3C		4C				
16	BUS	ECON	22	1B	1A	1A	1C	3C	3C	1P	1A	1B	1B	1A	2C	1B	2B	2C	4C	1B	2B	1A	2A	2B		3A	4B	2A	4C	1A	4C		
17	BUS	INFO SYS	18	1B	1A	1A	1C	3C	1B	1B	1A	2B	1B	1A	1B	2B	2B	3C	4C	1B	2B	1A	1A	2B		2A	4B	3A	4C		2C		1A	1A
18	BUS	MARKET	10	1B	1A	1A	1C	3C	3C	1B	1A	1B	1B	1A	2C	2B	2B	3C	4C	1B	3B	1A	2A	2B		3A	4B	1A	4C	1A	4C		
19	COM/PB AF	ADM JUST	11	2C	2A	3B	3B	3B	1B	1B	3A	5B	4A	4A	1B	1B				1B										5B		1B		5B	
20	COM/PB AF	RECREA	7	1C	2A	4A	4A	4C		4B	2A	4B	3A	5A		3A		5B															
21	COM/PB AF	REHAB	9	1C	1A	3B	3C	3C	5P	5P	4A		4A	3A	3C	5B		3	3C											5C			
22	COM/PB AF	URBAN ST	9		1B	1C	1B		1B				1B		1C	1B	1B	1B	5C	1B	4C	2B		3B	1B	1B	2C	1B	2B	1B		1B		
23	COM/PB AF	PUB ADM	6	1C	2A	3B	3C	3C	3B	3B	1A	3B	4A	5A	3C	3B	3B	1		1B							3B		5B				
24	COM/PB AF	CM PB AF	3	2C	1C	1C	1C	1C	3C	3C	1C	1C	2C	3C	1B	2B	4C	2B						1C					5C				
25	EDUC	EDUC STD	16	1C	2B	1P	2B	1B	1C	4B	1A	2P	3B	1A	4A	5C	3C	2B	1C	5C	2B			3C	3C	3C	5C						
26	EDUC	ED SERV	21	1C	2B	1B	4B	1P	1C	5A	1A	3P	3B	1A	3A		5C	3B	1B		2B			3C	4C	3C							
27	EDUC	PHYS ED	12	1C	2B	2B	3B	2P		2B	1A	2B	3A	1A	4B	5C	3C		2C										3C	5C			3C	
28	EDUC	TEACH ED	19	1C	3B	1B	3P	1B	1C	5B	1A	5B	3P	1A	3A		5C	3B	1B		3B				5C								
29	HUM & SCI	BIO	25	1C	1A	1B	1C	4C	4C	2P	1B	1C	3B	1B	3C	2B	2P	2B		1B	5B	2A		4C		5C	5C	1C	4C	1A			
30	HUM & SCI	CHEM	14	1B	1A	4B	4A	4C	2C	2P	5A	2C	3B	3A	4C	1B	2B		3C	1B		3B		3C	3C	3B	2C	1B	4A	1A	3C	3C	
31	HUM & SCI	ENGLISH	41	1B	1B	1B	1B	1C	1C	2B			3A	2A	3C	5B		3C	3C		4								4C		2C		
32	HUM & SCI	FOR LANG	10	4C	4A	4B	4C	5C		5B			5A	5A					4C		5C		5B						5C				
33	HUM & SCI	HIST	17	2C	2C	2C	3C	2C	2C	2C		3C	2C	5A	4C	4B		4C		5B	2C					5C			5C				
34	HUM & SCI	MASS COM	14	1B	1A	1C	3C	1C		1C	1A	5C		1A	5B	1B	3C	1C	3C	3C	3B				3C				5C				
35	HUM & SCI	MATH SCI	30	1P	1A	3B	3B		1B	1P	1B	1B	1B	2A	2B	1B	1C	3C	4C	2B		1A	1A			2B	1B	1B	4B	1B	5A		1A	1A
36	HUM & SCI	PHIL REL	9	1C	1A	1B	1C	1C		5B			3A				1A	5C											5C		3C		
37	HUM & SCI	PHYSICS	8	1B	1B	2B	2C	4C	1B	2B	5A	3C	3A	3A		3B	4P		5C	1B	3C	3A		5C	1B	5C	4C	1B	5C	1A	1C	3C		1B
38	HUM & SCI	SOLI SCI	8	2C	1C	1C	1C	1C		5B	2B			2B	4C	2B		4C			5C				1C	4C			5C				
39	HUM & SCI	PSYCH	29	1C	1A	1B	1C	1C	1C	2B	1B	2B	3A	4A	5C	3B	1B	1B		1B	2C				1B				4C				
40	HUM & SCI	SOCIOL	18	1B	2B	1P	2P	3P	1P	2B	1B	2A	3B	1B	1B	1B	1B	1B	3B	1B	1B	1B	3A	3B	1C	4B	5C	4B	3A	3A	3C	3B	3A	3A
41	SOC WRK	SOC WRK	50	1B	1A	1B	2B	1B	2B	2P	1A	2B	3D	4A	5B	5B	1P	3B		5C	5C	1A		2C					3C				